

# Instructions

for the



## DC POWER SUPPLY

Model SK-101

DATE OF PURCHASE  
10-1-86

SERIES# 02-64618

## INTRODUCTION

Your Heathkit Model SK-101 Power Supply contains all of the parts you need to assemble a voltage-regulated, power source. The normal output voltage of the Supply is continuously variable from 4 to 18 volts DC at 2 amperes. However, during the assembly, you can install a zener diode to provide a reduced range of 4 to 14 volts at 3 amperes. The Power Supply operates from a 120 volt 60 Hz AC source.

This Manual contains step-by-step assembly instructions, a brief troubleshooting guide, and a schematic diagram. For additional information on product description, product applications, and educational material consisting of circuit theory and a quiz, refer to the SK-100 Series Educational Manual.

Refer to the "Kit Builder's Guide" for additional information on:

- Parts Identification.
- Tools.
- Wiring.
- Soldering.
- Step-by-Step Assembly procedures.
- Warranty and Customer Service Information.

## PARTS LIST

Unpack the kit and check each part against the following list. The key numbers correspond to the numbered illustrations.

To order a replacement part, always include the PART NUMBER. Use the Parts Order Form furnished with this kit.

KEY No.	HEATH Part No.	QTY.	DESCRIPTION	CIRCUIT Comp. No.
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## RESISTORS

NOTE: The resistors are rated at 1/2-watt and have a 5% tolerance, unless otherwise noted. 5% resistors have a gold fourth color band which will not be called out.

A1	6-121	1	120 $\Omega$ (brn-red-brn)	R5
A1	6-221	1	220 $\Omega$ (red-red-brn)	R4
A2	3-51-5	2	1.2 $\Omega$ , 5-watt, wire-wound	R1, R2

## CAPACITORS

B1	21-786	1	.1 $\mu$ F (104) axial-lead ceramic	C3
B2	25-870	1	100 $\mu$ F electrolytic	C4
B2	25-910	2	3300 $\mu$ F electrolytic	C1, C2

## SEMICONDUCTORS

## Diodes

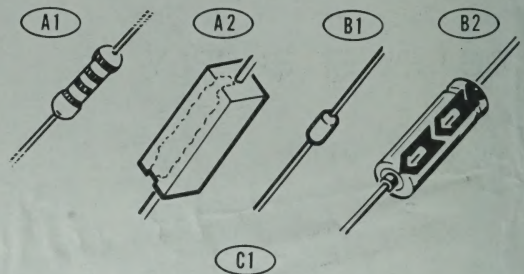
C1	56-32	1	VR13.5 zener	D7
C1	57-27	2	1N5397	D5, D6
C1	57-42	4	1N5401	D1, D2, D3, D4

## Integrated Circuit (IC)

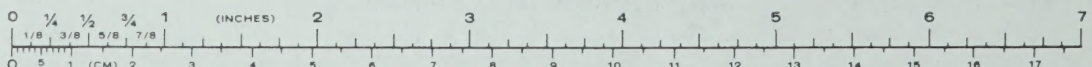
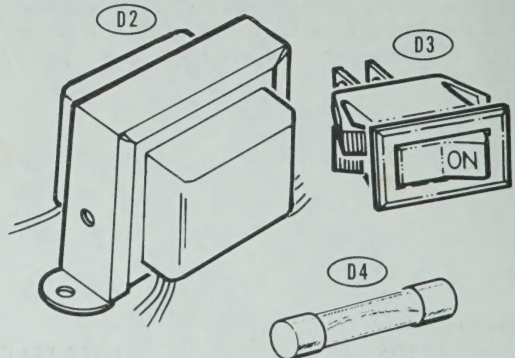
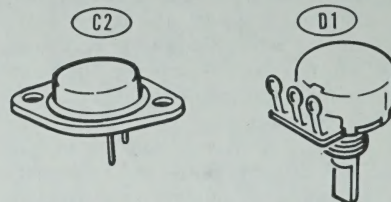
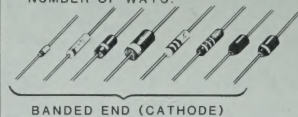
C2	442-703	1	LM350K	U1
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## OTHER ELECTRONIC PARTS

D1	10-1053	1	3000 $\Omega$ (3k) control	R3
D2	54-935	1	Power transformer	T1
D3	61-49	1	Rocker switch	SW1
D4	421-29	1	3/4-ampere, 3AG, slow-blow fuse	F1



IMPORTANT: THE BANDED END OF DIODES CAN BE MARKED IN A NUMBER OF WAYS.





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KEY	HEATH	QTY.	DESCRIPTION
No.	Part No.		

## TERMINAL STRIPS

E1	431-28	2	2-lug
E2	431-613	1	4-lug (with fuse clips)
E3	431-81	1	6-lug

## INSULATORS

F1	75-17	4	Binding post insulator
F2	75-30	1	Strain relief
F3	75-44	1	Mica insulator
F4	75-88	1	Transistor cover
F5	75-103	1	Insulator paper
F6	100-16-2	1	Black binding post cap
F6	100-16-18	1	Red binding post cap

## LINE CORD - WIRE - SLEEVING

89-54	1	Line cord
344-16	12"	Red wire
344-80	9"	Orange wire
344-81	12"	Violet wire
344-200	9"	Black wire
344-214	9"	Yellow wire
346-20	3"	Heat-shrinkable sleeving

## HARDWARE

NOTE: You may have to open more than one packet to locate all of the hardware of any one size (#6, for example).

### #6 Hardware

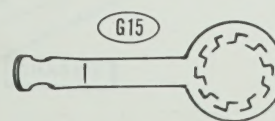
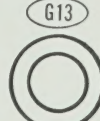
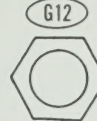
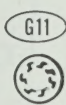
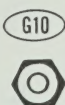
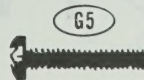
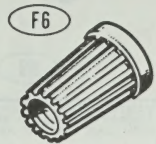
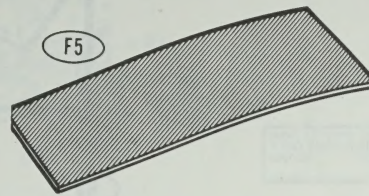
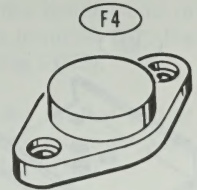
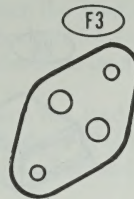
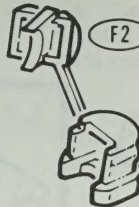
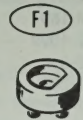
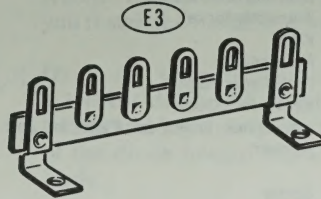
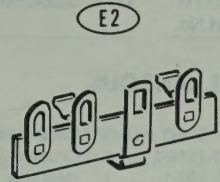
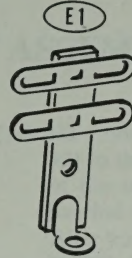
G1	250-28	1	6-32 × 1/4" setscrew
G2	250-1325	3	6-32 × 1/4" screw
G3	250-1280	4	6-32 × 3/8" screw
G4	250-1432	4	#6 × 3/8" sheet metal screw
G5	250-1426	2	6-32 × 3/4" screw
G6	252-3	11	6-32 nut
G7	254-1	11	#6 lockwasher
G8	259-1	5	#6 solder lug

### #8 Hardware

G9	250-1436	2	8-32 × 3/8" screw
G10	252-4	2	8-32 nut
G11	254-2	2	#8 lockwasher

### Other Hardware

G12	252-76	1	Control nut
G13	253-10	1	Control flat washer
G14	255-1	2	1/8" spacer
G15	259-10	1	Control solder lug
G16	427-3	2	Binding post base

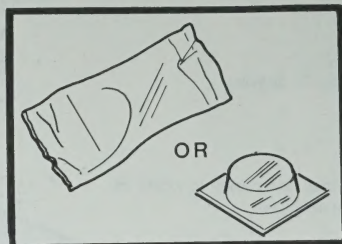
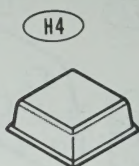
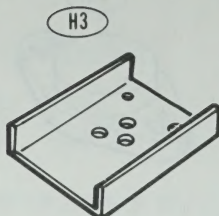
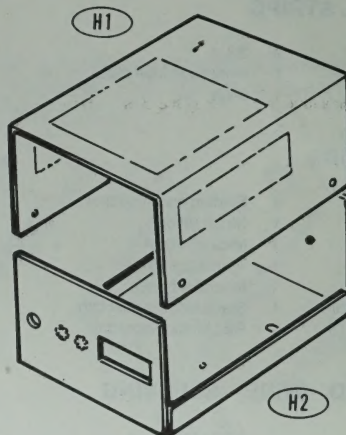


KEY	HEATH	QTY.	DESCRIPTION
No.	Part No.		

**MISCELLANEOUS**

✓ H1	90-1316-3	1	Cabinet cover
✓ H2	200-1519-1	1	Chassis
✓ H3	215-690-1	1	Heat sink
✓ H4	261-49	4	Plastic foot
✓ H5	352-31	1	Thermal compound
✓ H6	390-1255	1	Fuse label
✓ H7		1	Blue and white label
✓ H8	434-189	1	Transistor socket
✓ H9	462-1099	1	Knob
✓ H10	490-5	1	Nut starter
	597-260	1	Parts Order Form
	597-4212	1	Kit Builder's Guide
		1	Instructions (see front Page for part number)

Solder



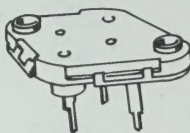
H6

CAUTION: FOR CONTINUED PROTECTION  
AGAINST FIRE HAZARD, REPLACE FUSE ONLY  
WITH SAME TYPE AND RATING. 390-1255

H7



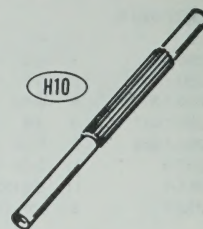
H8



H9



H10





## STEP-BY-STEP ASSEMBLY


Refer to Pictorial 1 for the following steps.

- (4) Position the chassis bottom-side-up as shown in the Pictorial.

**NOTE:** Use the plastic nut starter supplied with this kit to hold and start 6-32 nuts on screws.

- 4) Temporarily mount the 6-lug terminal strip onto the chassis bottom. Use a 6-32  $\times$  3/8" screw and a 6-32 nut at the indicated mounting holes. It will be easier to mount and solder parts to the terminal strip in this manner than it would be after the terminal strip is mounted inside the chassis.

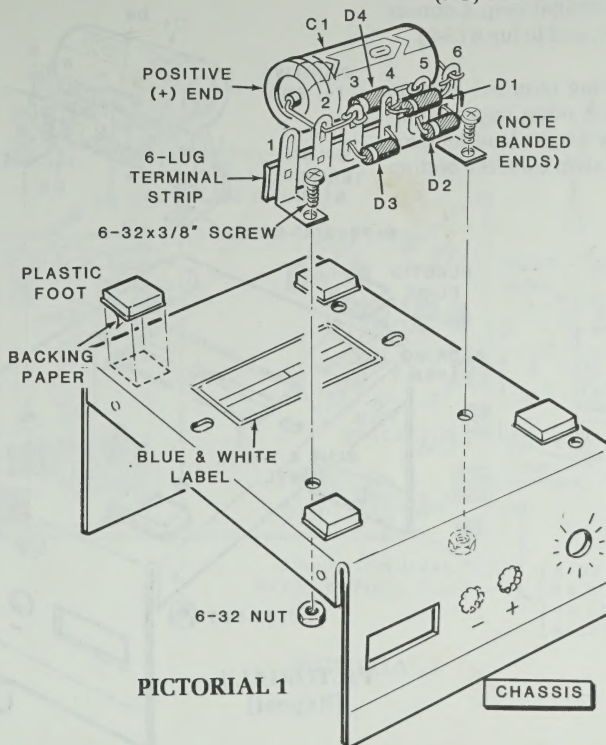
- (X) Refer to the Kit Builder's Guide and read the information under "Chassis Wiring." Then proceed with the following steps.

-  D3: Connect the leads of a 1N5401 diode (#57-42) to the eyelets of lug 3 (S-1) and lug 4 (S-1) of the terminal strip. Be sure to position the banded end of the diode toward lug 3 as shown. After you solder, cut off the excess lead lengths. NOTE: The circuit will not work properly if you install the diode backwards.

- (X) D2: In the same manner, connect the leads of a 1N5401 diode (#57-42) to the eyelets of lug 5 (S-1) and lug 6 (S-1). Position the banded end of the diode toward lug 5. Cut off the excess leads.

- (X) D4: Connect the lead at the banded end of a 1N5401 diode (#57-42) to terminal strip lug 3 (NS) and the other lead to lug 5 (NS).

- (X) D1: Connect the lead at the banded end of a 1N5401 diode (#57-42) to terminal strip lug 4 (NS) and the other lead to lug 6 (NS).



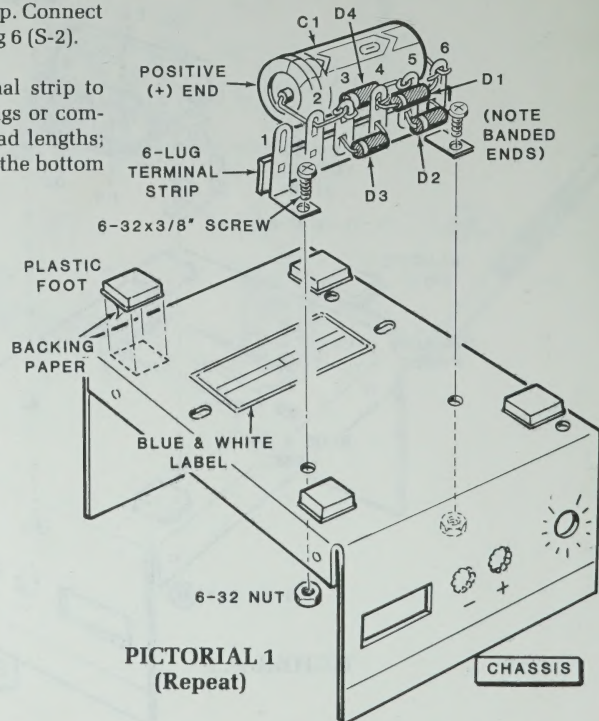
## NOTES:

1. When you install an electrolytic capacitor, as in the following step, identify its leads. One lead will have a positive (+) mark or a negative (-) mark near it. Be sure you connect the positive lead when a step calls for the positive lead.
  2. When a wire passes through a connection and then goes to another point, as in the following step, it will count as two wires in the solder instructions (S-2), one entering and one leaving the connection. Be especially careful when you solder these connections to apply enough solder and heat to solder these "through wires."
  3. When you solder the leads to the 6-lug terminal strip in the following step, the solder instructions do not include the leads that were previously soldered in the eyelets of the terminal strip.
- ✂ C1: Pass the lead at the positive (+) end of a 3300  $\mu$ F electrolytic capacitor through lug 2 (NS) to lug 3 (S-2) of the terminal strip. Connect the lead at the negative (-) end to lug 6 (S-2).
- ✂ Check each lug of the 6-lug terminal strip to see that no lead ends touch other lugs or component leads. Clip off any excess lead lengths; then remove the terminal strip from the bottom

of the chassis. NOTE: You will refer to the pre-wired terminal strip as TS1 when you install it later. Also, you will solder lugs 2, 4, and 5 later.

NOTE: In the following two steps, do not cover up any of the chassis holes.

- ✂ Peel away the backing paper from a plastic foot. Then press the adhesive side of the foot to the chassis bottom as shown in the Pictorial.
- ✂ In the same manner, install the remaining three plastic feet.
- ✂ Carefully peel away the backing paper from the blue and white label. Then press the label onto the chassis bottom at the location shown. Be sure you do not cover up any of the holes in the chassis. NOTE: Be sure to refer to the numbers on this label in any communications you may have with the Heath Company about this kit.





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Refer to Pictorial 2 for the following steps.

- ✂ Reposition the chassis as shown in the Pictorial.
- ✂ Scrape or sand any excess paint from holes A, C, E, F, G, and H on the inside of the chassis. It is important that the parts to be mounted at these locations make a good electrical contact with the chassis.

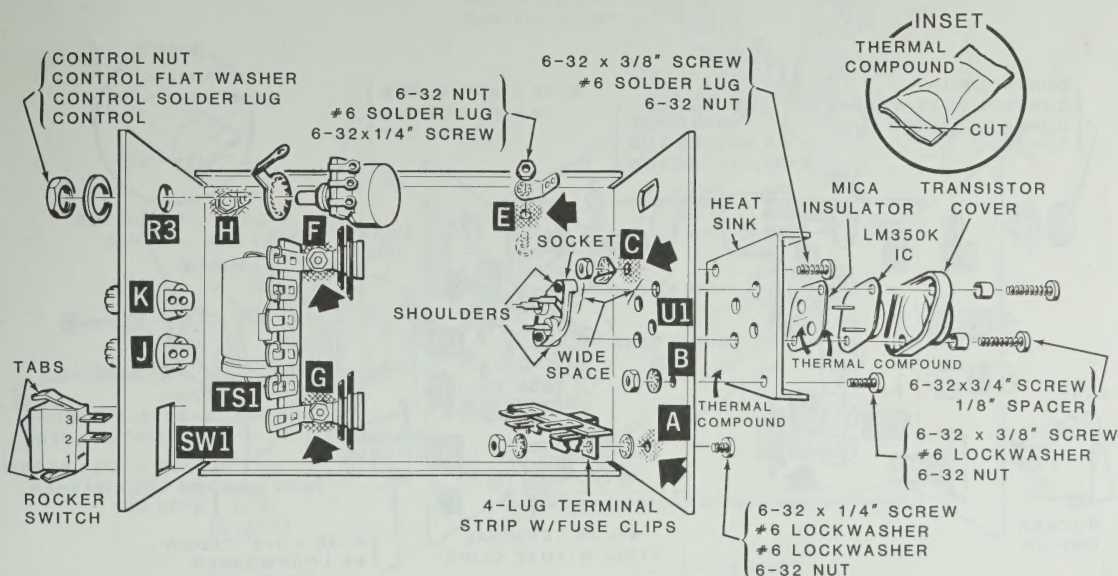
NOTE: When a step calls for hardware, only the screw size is given. For instance, if "6-32 x 1/4" hardware" is called for, it means you should use a 6-32 x 1/4" screw, one or more #6 lockwashers, and a 6-32 nut at each mounting hole. The Detail referred to in the step will show the proper number and placement of each hardware item.

- ✂ Mount a 4-lug terminal strip (with fuse clips) onto the inside rear of the chassis at A as shown in the Pictorial. Use 6-32 x 1/4" hardware.

WARNING: You will be using Dow Corning 340 thermal compound in the next step and other steps in the Manual. Although the compound is not caustic, it may cause temporary discomfort if it gets into your eyes. If this happens, rinse your eyes with warm water. If the compound gets into your clothing, the clothing may require professional cleaning. The compound contains Zinc Oxide,  $ZnO_2$ .

- ✂ Use the following procedure to mount the heat sink to the outside rear of the chassis.

1. Refer to the inset drawing in Pictorial 2 and use scissors to cut a corner from the packet of thermal compound. Then apply a thin coating to the indicated side of the heat sink.
2. Place the heat sink on the rear of the chassis so all six holes in one part line up with the corresponding holes in the other. Then loosely fasten the heat sink to the chassis with 6-32 x 3/8" hardware at B and C. Be sure to use a #6 solder lug instead of a #6 lockwasher at C. You will tighten the hardware later.



PICTORIAL 2

- ✂ Locate the following items for use in the next step:

One transistor socket  
 One mica insulator (#75-44)  
 One thermal compound container (opened earlier)  
 One LM350K IC (integrated circuit, #442-703)  
 One transistor cover  
 Two 1/8" spacers  
 Two 6-32 × 3/4" screws

- ✂ U1: Use the following procedure to install an LM350K IC onto the outside rear of the chassis at U1 as shown.

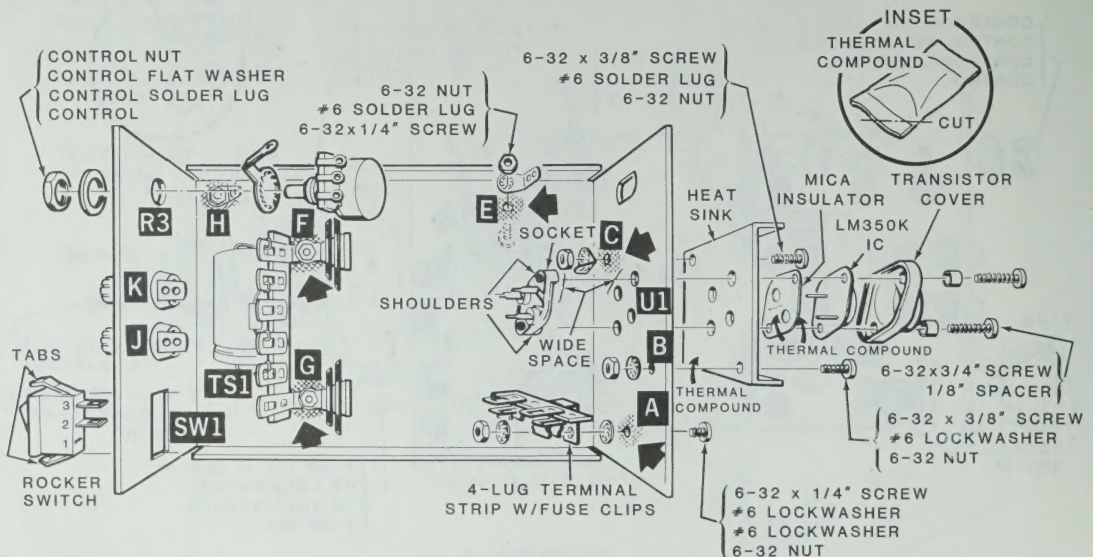
1. Apply a thin coat of thermal compound to both sides of the mica insulator. Place the insulator on the IC with the wide space positioned as shown.
2. Carefully observe the wide spacing of the holes in the chassis at U1 and position the socket on the inside of the chassis as shown in the Pictorial. Be sure the shoulders of the socket enter the two mounting holes for U1.

3. Pass the pins of the LM350K IC through the holes in the mica insulator, heat sink, and the chassis and push them into the socket.
4. Make sure the shoulders on the socket are still seated in the holes in the chassis. Then mount a transistor cover over the IC with two 1/8" spacers and two 6-32 × 3/4" screws.

- ✂ Tighten the hardware at B and C on the chassis. Be sure to position the #6 solder lug as shown in the Pictorial.

- ✂ Mount a #6 solder lug on the inside bottom of the chassis at E. Use a 6-32 × 1/4" screw and a 6-32 nut. Be sure to position the solder lug as shown in the Pictorial.

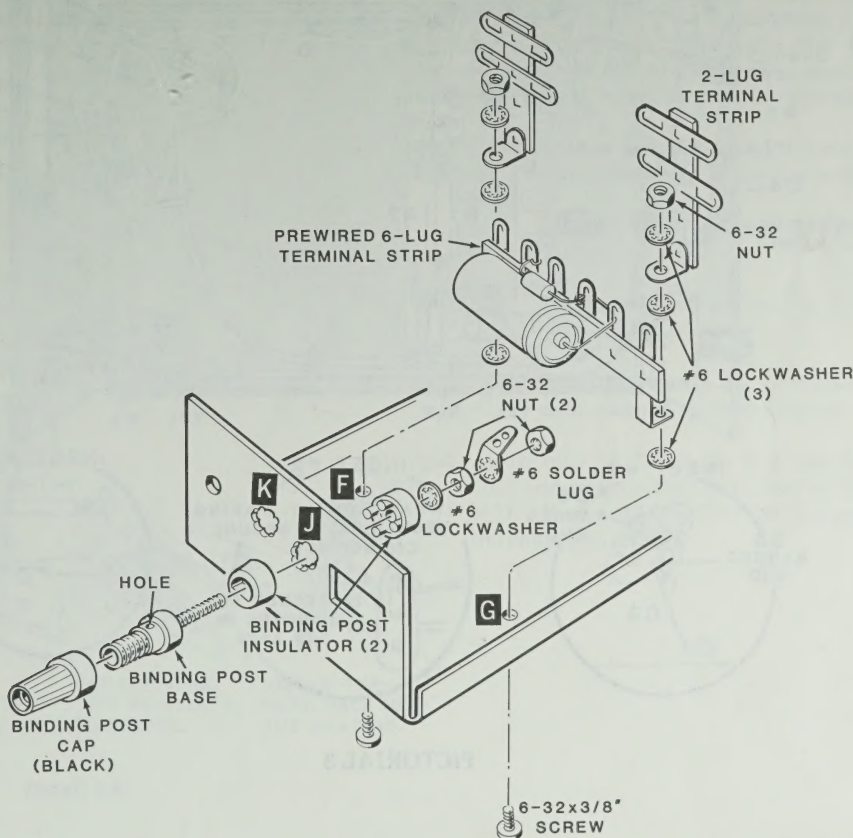
- ✂ In the same manner, mount a #6 solder lug on the inside bottom of the chassis at H. Be sure to position the solder lug as shown in the Pictorial.



PICTORIAL 2  
 (Repeat)





- ✂ TS1: Refer to Detail 2A and install the prewired 6-lug terminal strip on the inside bottom of the chassis at F and G. Use a 2-lug terminal strip and 6-32  $\times$  3/8" hardware at each of the two mounting locations. Be sure to position all three terminal strips as shown in the Pictorial.
- ✂ Refer again to Detail 2A and mount a binding post base on the front of the chassis at J. Use two binding post insulators, a #6 lockwasher, a #6 solder lug, and two 6-32 nuts. Position the hole in the binding post base perpendicular to the bottom edge of the chassis. Also be sure to position the solder lug as shown in the Pictorial.
- ✂ In the same manner, install a binding post base on the front of the chassis at K. Be sure to position the solder lug as shown in the Pictorial.
- ✂ Turn a black binding post cap onto binding post base J.
- ✂ Turn a red binding post cap onto binding post base K.
- ✂ SW1: Position the rocker switch with the lugs as shown and press it into the cutout in the front of the chassis at SW1 until the tabs lock into place.
- ✂ R3: Mount a 3000  $\Omega$  (3k) control (#10-1053) on the front of the chassis at R3. Use a control solder lug, a control flat washer, and a control nut. Be sure to position the control and solder lug as shown in the Pictorial.





Detail 2A


Refer to Pictorial 3 for the following steps.

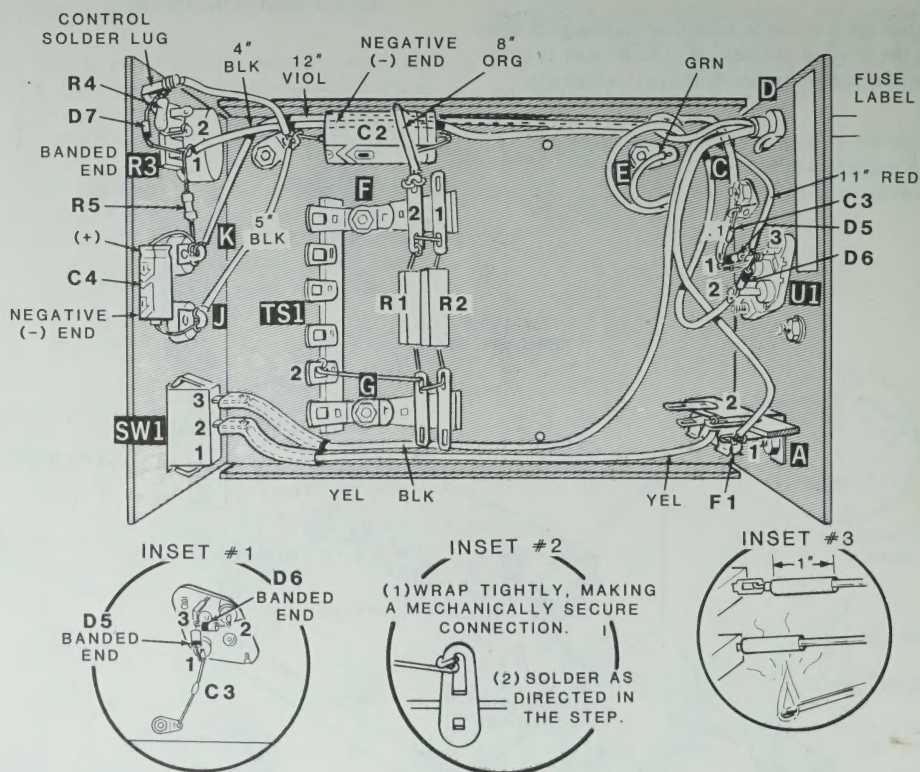
 D6: Refer to inset drawing #1 and connect the lead at the banded end (cathode) of a 1N5397 diode (#57-27) to U1 lug 3 (NS). Connect the other lead (anode) to U1 lug 2 (NS).

 D5: Again refer to inset drawing #1 and connect the lead at the banded end of a 1N5397 diode (#57-27) to U1 lug 1 (NS). Connect the other lead to U1 lug 3 (NS).

 C3: Connect one lead of a .1  $\mu$ F (104) axial-lead ceramic capacitor as shown in inset drawing #1 to U1 lug 1 (NS), and connect the other lead to solder lug C (S-1).


 R1: Pass one lead of a 1.2  $\Omega$ , 5-watt wire-wound resistor through terminal strip G lug 2 (NS) to terminal strip TS1 lug 2 (S-3). Connect the other lead to terminal strip F lug 2 (NS).


 R2: Pass one lead of a 1.2  $\Omega$ , 5-watt wire-wound resistor through terminal strip G lug 1 (S-2) to lug 2 (S-3). Pass the other lead through terminal strip F lug 1 (S-2) to lug 2 (S-2).





PICTORIAL 3




 C2: Connect the lead at the negative (-) end of a 3300  $\mu$ F electrolytic capacitor to solder lug H (NS). Connect the lead at the positive (+) end to terminal strip F lug 2 (NS). CAUTION: Do **not** bend this lead against the capacitor body; otherwise, you may burn through the insulation and short the capacitor when you solder the lead.

 C4: Connect the lead at the negative (-) end of the 100  $\mu$ F electrolytic capacitor to solder lug J (NS). Connect the lead at the positive (+) end to solder lug K (NS).


 R5: Connect a 120  $\Omega$  (brn-red-brn) resistor between solder lug K (NS) and control R3 lug 1 (NS).

 R4: Connect a 220  $\Omega$  (red-red-brn) resistor between control R3 lug 2 (S-1) and the control solder lug (NS).


NOTE: The normal output voltage range for your power supply is about 4 to 18 VDC at a constant current drain of 2 amperes maximum. However, by installing the zener diode in the next step, you will establish a fixed upper voltage limit of about 14 VDC. With the zener diode installed, you may increase the current drain to 3 amperes with a 50% duty cycle (5 minutes on and 5 minutes off) over a 7 to 14 VDC range. Perform the next step only if you wish this reduced voltage range. Otherwise, skip this step.

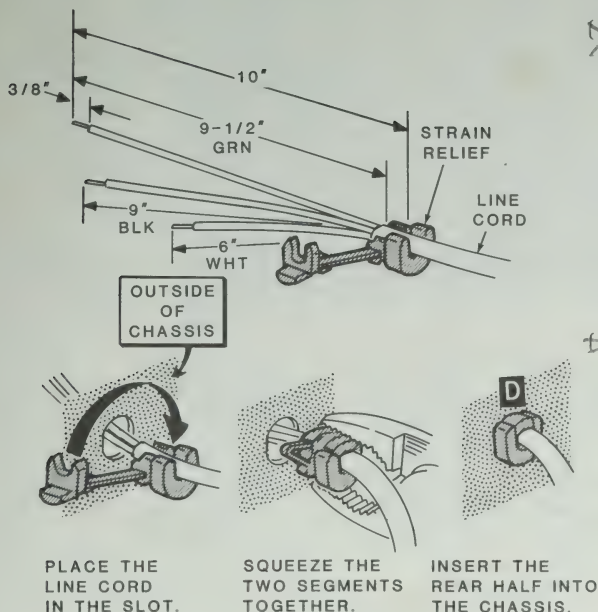
 D7: Connect the lead at the banded end of a VR13.5 zener diode (#56-32) to control R3 lug 1 (NS). Connect the other lead to the control solder lug (NS).

NOTE: When you are instructed to prepare a wire or lead, cut it to the specified length and remove 1/4" of insulation from the end (unless a different amount is specified). Then twist the fine wire strands tightly together and apply a small amount of solder to the wire strands to hold them together.

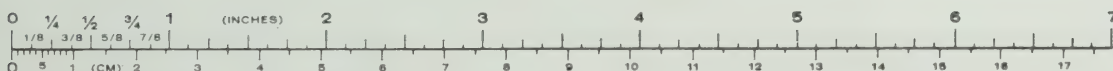
 Refer to Detail 3A and use the following procedure to prepare the end of the line cord:

1. Remove 9-1/2" of outer insulation from the line cord.
2. Shorten the white lead to 6" and the black lead to 9".
3. Carefully remove 3/8" of insulation from each lead and prepare the ends.

 Again refer to Detail 3A and install the line cord and strain relief in the rear of the chassis at D. Allow a 10" length of the line cord inside the chassis as shown.



Detail 3A



NOTE: Refer to inset drawing #1 in Pictorial 3 whenever a step directs you to make a mechanically secure connection.

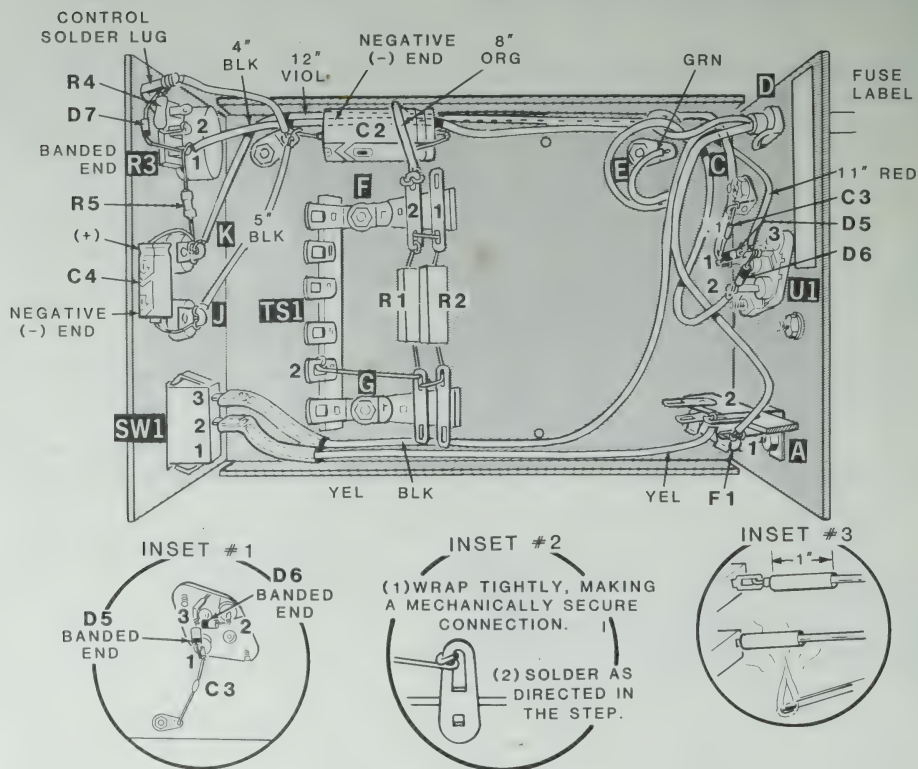
Connect the green and white line cord leads as follows. Make sure the connections are mechanically secure.

✂ Green lead to chassis solder lug E (S-1). Form a loop in this lead as shown. NOTE: Do not shorten this wire.

✂ White lead to terminal strip A lug 1 (NS).

✂ Prepare an 8-1/2" yellow wire by removing 3/8" of insulation from the wire ends. Then connect one end of the wire to terminal strip A lug 2 (S-1). Make a mechanically secure connection. NOTE: You will connect the other end of this wire later.

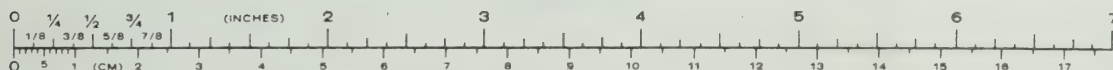
✂ Cut two 1" lengths of heat-shrinkable sleeving. Use these lengths of sleeving in the next two steps.





PICTORIAL 3  
(Repeat)




- ( ) Refer to inset drawing #2 in Pictorial 3 and use the following procedure to connect the free end of the yellow wire to rocker switch SW1.
- ☒ Slide a 1" length of heat-shrinkable sleeving onto the free end of the yellow wire.
  - ☒ Route the yellow wire around terminal strips G and TS1 as shown in the Pictorial. Then connect this wire to switch SW1 lug 2 (S-1). Make a mechanically secure connection.
  - ☒ After the connection cools, slide the sleeving onto the switch lug so the sleeving completely covers the lug.
  - ☒ Refer to inset drawing #3 in Pictorial 3 and use the heat from a match, lighter, or candle to shrink the sleeving against the wire and the switch lug. Be sure to keep the heat source moving so you do not burn the sleeving.
  - ☒ In the same manner, place a 1" length of heat-shrinkable sleeving over the free end of the black line cord lead. Then route the lead around terminal strips G and TS1 and connect it to switch SW1 lug 3 (S-1). Make a mechanically secure connection. Shrink the sleeving around the lug as in the previous step.
  - ☒ Prepare the following lengths of wire. The wires will be used in the order you prepare them.
- 11" red
- 8" orange
- 12" violet
- 5" black
- 4" black
- ☒ Connect one end of the 11" red wire to integrated circuit U1 lug 3 (S-3). Connect the other end to solder lug K (S-3).
  - ☒ Connect one end of the 8" orange wire to integrated circuit U1 lug 1 (S-3). Connect the other end to terminal strip F lug 2 (S-2).
  - ☒ Connect one end of the 12" violet wire to integrated circuit U1 lug 2 (S-2). Connect the other end to control R3 lug 1 (S-2). NOTE: If you previously installed zener diode D7, the last solder step will be (S-3).
  - ☒ Connect one end of the 5" black wire to solder lug J (S-2). Connect the other end to solder lug H (NS).
  - ☒ Connect one end of the 4" black wire to solder lug H (S-3). Connect the other end to the control solder lug (S-2). NOTE: If you previously installed zener diode D7, the last solder step will be (S-3).
  - ☒ F1: Push the 3/4-ampere, 3AG, slow-blow fuse into the fuse clips on terminal strip A.
  - ☒ Locate the fuse label (#390-1255) and write "3/4 AMP 3AG SLO-BLO" on the bottom line. Then peel off the backing paper, position the label as shown, and apply it on the inside rear of the chassis in the area shown.




 Refer to Pictorial 4 for the following steps.


 Refer to Detail 4A and use the following procedure to mount the power transformer onto the inside bottom of the chassis.


 Using a pair of diagonal cutters, shorten both red and the black-red transformer leads to 2-1/2". Measure the leads from the point where they exit the transformer. Then remove 3/8" of insulation from the ends of these leads. Be careful not to pull the leads away from the transformer windings when you prepare the ends. Do not shorten the other transformer leads.


2. Be sure you do not pinch any of the wires that you previously connected to the various points on the chassis. Also be sure to route the leads as shown in the Pictorial.


3. Use 8-32  $\times$  3/8" hardware to mount the transformer onto the chassis as shown. Be sure to position the transformer so the red leads are toward terminal strip TS1 as shown in the Pictorial.

 Connect the black-red transformer lead to terminal strip A lug 4 (NS).


 Connect the black-yellow transformer lead to terminal strip A lug 4 (S-2).


 Connect the black-green transformer lead to terminal strip A lug 1 (NS).


 Connect the black transformer lead to terminal strip A lug 1 (S-3).

 Connect the indicated red transformer lead to terminal strip TS1 lug 4 (S-2).

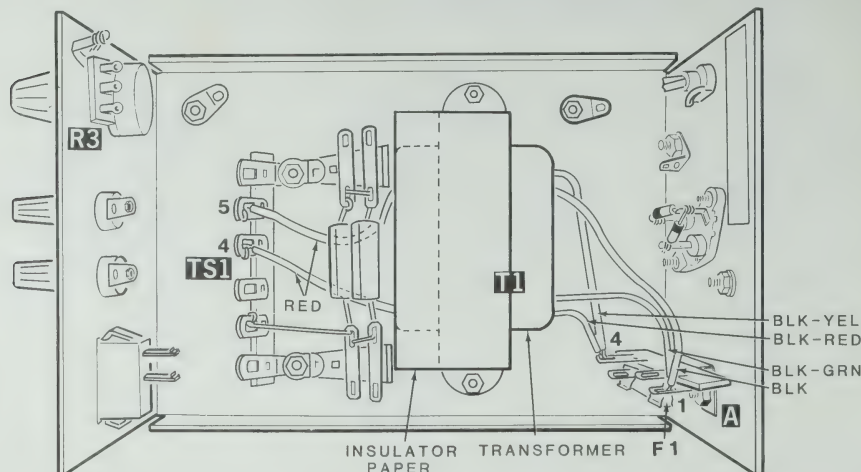
( ) Connect the other red transformer lead to terminal strip TS1 lug 5 (S-2).

 Refer to Detail 4B and start a 6-32  $\times$  1/4" setscrew into the knob.

 Turn the shaft of control R3 fully counterclockwise. Then install the knob on the shaft of the control and tighten the setscrew against the flat on the control shaft.

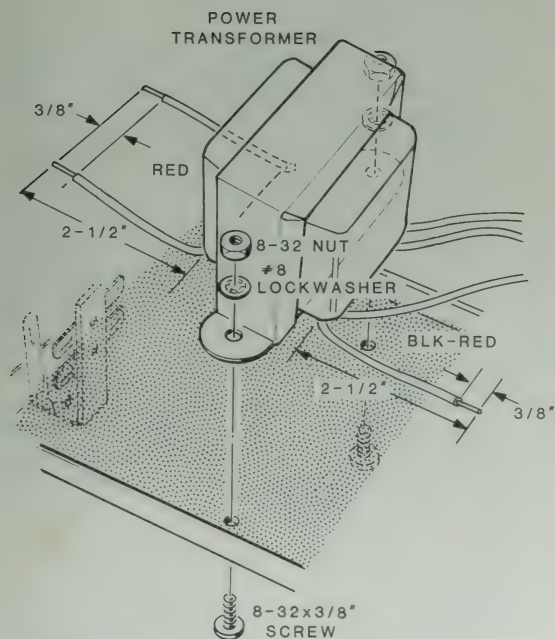
 Refer to Detail 4C and cut a 3-1/4"  $\times$  1-7/8" length of insulator paper. Then peel off the backing paper, and apply the insulator paper to the top of the transformer as shown in the Pictorial.

This completes the "Step-by-Step Assembly" of your Power Supply. Recheck each connection to make sure it is soldered properly, especially points where several wires are connected. Also recheck your wiring against Pictorial 3 to make sure it is correct. After you make these checks, proceed to "Initial Tests."

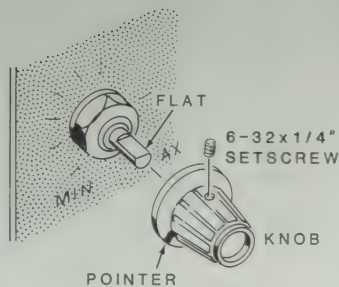


PICTORIAL 4

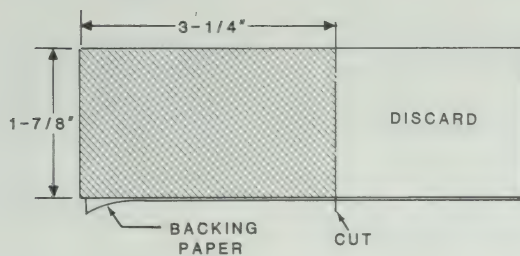




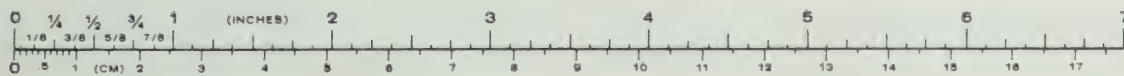
Detail 4A



Detail 4B



Detail 4C



## INITIAL TESTS

### PRIMARY WIRING CHECKS

A wiring error in the primary circuit of your power supply (transformer wiring, line cord, etc.) could cause you to receive a severe electrical shock. These "Primary Wiring Checks" will help you eliminate any such wiring errors that may exist. NOTE: Do not connect the line cord plug to an AC outlet until you are instructed to do so in a step.

You will need a VOM (volt-ohmmeter), VTVM (vacuum tube voltmeter), or a DMM (digital multimeter) when you perform the following resistance and voltage tests. If you do not have any of these meters, try to borrow one from a friend. It is important that you perform these tests. If you do not get the proper resistance or voltage readings, turn the Power Supply off and disconnect its line cord plug from the AC outlet (if it has been connected). Then refer to the "In Case of Difficulty" section in this Manual to help you locate the problem. Do not apply power to the Power Supply if you do not obtain the correct readings.

Refer to Pictorial 5 for the following steps.

- ☒ Be sure the Power Supply's line cord plug is not connected to an AC outlet.
- ☒ Be sure the POWER switch is off.

NOTE: If you do not have an ohmmeter and you cannot obtain one, carefully check the line cord, switch SW1, and transformer wiring against Pictorial 3. Also, make sure there are no fine strands of wire or solder globs touching adjacent terminals or the chassis.

- ☒ Turn on your ohmmeter and allow it to warm up, if necessary, if this has not already been done.
- ☒ Set your ohmmeter to the  $R \times 10 \text{ k}\Omega$  range.

- ☒ Connect the common (-) ohmmeter lead to solder lug E inside the chassis. Leave this lead connected to solder lug E until a step directs you to disconnect it.

- ☒ Touch the positive (+) ohmmeter lead to either flat prong of the line cord plug. The meter should indicate infinity with the POWER switch on or off. If you do not obtain the correct indication, check the wiring of terminal strip A and switch SW1.

- ☒ Touch the positive ohmmeter lead to the other flat prong of the line cord plug. The meter should indicate infinity with the POWER switch on or off. If you do not obtain the correct indication, check the wiring of terminal strip A and switch SW1.

- ☒ Set the ohmmeter to the  $R \times 10$  range.

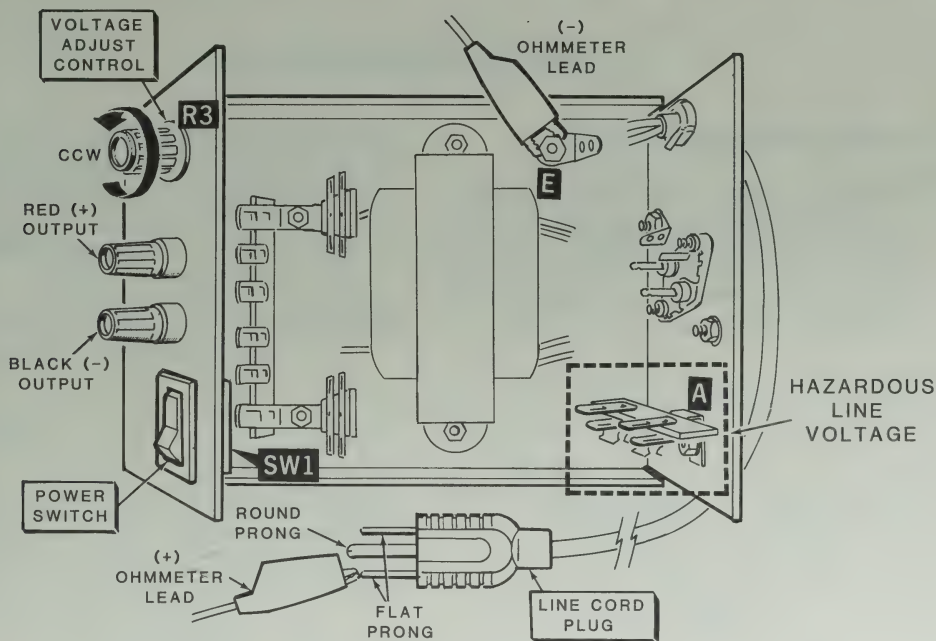
- ☒ Touch the positive ohmmeter lead to the round prong on the line cord lead. The meter should indicate  $0 \Omega$  with the POWER switch on or off. If you do not obtain the correct indication, make sure the green line cord lead is connected to solder lug E.

- ☒ Disconnect the negative ohmmeter lead from solder lug E and connect it to either flat prong of the line cord plug.

- ☒ Connect the positive ohmmeter lead to the other flat prong of the line cord lead. The ohmmeter should indicate INF (infinite) with the POWER switch off and  $5$  to  $20 \Omega$  with the POWER switch on. If you do not obtain the correct indications, check the wiring of terminal strip A and switch SW1.

- ☒ Disconnect the ohmmeter leads from the line cord plug.





PICTORIAL 5

## VOLTAGE TESTS

**CAUTION:** You will apply power to your Power Supply for the following tests. When the line cord plug is connected to an AC outlet, the potentially hazardous line voltage will be present at terminal strip A on the chassis. Be careful; if you touch this voltage, you will receive a severe electrical shock.

**NOTE:** If you experience any difficulties when you apply power to your Power Supply, press the POWER switch off and immediately disconnect the line cord plug from the AC outlet. Do not proceed with any further tests until you correct the problem.

- ☒ Turn on your voltmeter and allow it to warm up, if this has not already been done.
- ☒ Be sure the POWER switch is off.
- ☒ Turn Voltage Adjust control R3 fully counter-clockwise, if this has not already been done.
- ☒ Connect the negative voltmeter lead to the black (-) output post.
- ☒ Connect the positive voltmeter lead to the red (+) output post.

☒ Connect the Power Supply's line cord plug to an AC outlet.

☒ Set the voltmeter to read +25 volts DC.

**NOTE:** If you do not get the correct results in the following steps, refer to the "In Case of Difficulty" section.

- ☐ Press the Power Supply's POWER switch on. The voltmeter should indicate about +4 volts.
- ☐ Turn Voltage Adjust control R3 fully clockwise. If you installed zener diode D7, the voltmeter should indicate +14.0 volts. Otherwise, the voltmeter should indicate about +25 volts.
- ☐ Press the Power Supply POWER switch off.
- ☐ Disconnect the Power Supply's line cord plug from the AC outlet.
- ☐ Disconnect the voltmeter leads from the Power Supply.

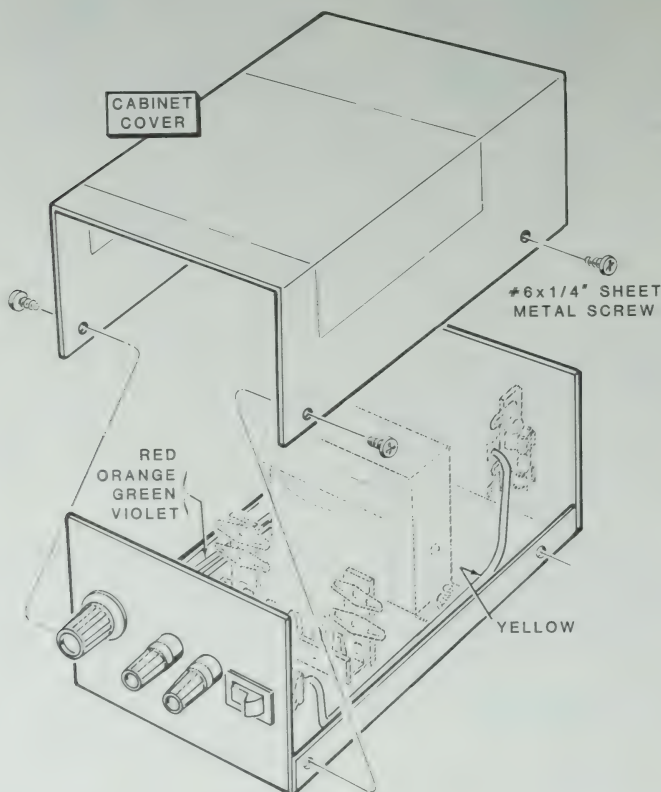
This completes the "Initial Tests." Proceed to "Final Assembly."

## FINAL ASSEMBLY

Refer to Pictorial 6 for the following steps.

- ( ) Position all wires away from the cabinet mounting holes. Pay particular attention to the yellow wire that is routed along the right side of the chassis. Also note the red, orange, green, and violet wires that are routed along the left side of the chassis.
- ( ) Set the cabinet cover onto the chassis as shown in the Pictorial. Be sure the area without holes is toward the rear of the chassis as shown.
- ( ) Use four #6  $\times$  1/4" sheet metal screws to secure the cabinet cover to the chassis.

This completes the "Final Assembly."



PICTORIAL 6



## IN CASE OF DIFFICULTY

Begin your search for any trouble that occurs after assembly by carefully following the steps listed below in the "Visual Tests." If you do not locate the trouble after completing the "Visual Tests," refer to the "Troubleshooting Chart."

You will find it helpful to refer to the Schematic Diagram and Circuit Description\* as you trace the circuit to locate the cause of the problem.

### VISUAL TESTS

1. Carefully inspect the complete unit for any obvious errors, such as improperly soldered connections, wiring errors, bare wires touching each other, etc. Look for bits of solder, pieces of wire, or other foreign matter lodged in the wiring or components.
2. Make sure each wire or lead is connected to the proper point. It is quite helpful to have another person check your work. Someone unfamiliar with the unit will often notice an error that you have repeatedly overlooked.
3. About 90% of the kits that are returned for repair do not function properly due to poor connections and soldering. Therefore, you can eliminate many difficulties by carefully inspecting each connection to make sure it is soldered as described in the "Soldering" instructions in your Kit Builder's Guide. Reheat any doubtful connections.
4. Check to be sure each diode lead is connected to the proper point. Make sure that each diode band is positioned as shown in the Pictorial.
5. Check the values of the parts. In each step, be sure the proper part has been wired into the circuit, as shown in Pictorial. It would be easy, for example, to install a 120  $\Omega$  (brn-red-brn) resistor where a 220  $\Omega$  (red-red-brn) should have been installed.
6. A review of the "Circuit Description"\* may also help you determine where the trouble is.

NOTE: In an extreme case where you are unable to resolve a difficulty, refer to the "Customer Service" information in the "Kit Builder's Guide." Your Warranty is also located there.

\*Included with the optional SK-100 Educational Series Manual.

## Troubleshooting Chart

The following chart lists specific difficulties that could occur in your Power Supply, with several possible causes for each malfunction. If a particular part (U1, for example) is mentioned as a possible cause,

check that part to see that it is installed and soldered correctly. It is also possible, on rare occasions, that a part may be faulty and require replacement.

PROBLEM	POSSIBLE CAUSE
Supply is completely inoperative.	A. Line cord is not connected to an AC outlet. B. Fuse F1. C. Switch SW1.
No DC input voltage at U1 (pin 1).	A. Diodes D1 through D4. B. Capacitors C1 or C2. C. Resistors R1 or R2.
DC input voltage at U1 okay, but output voltage is only about +1.2 VDC.	A. U1's ADJ pin grounded. B. Resistors R3 through R5 and their wiring. C. Poor electrical contact between regulator U1's case and its socket.
DC output voltage exceeds +18 volts; however, it will not vary when you turn control R3.	A. Resistors R3 through R5 and their wiring. B. Diode D5. C. Integrated circuit U1.
Output voltage range is only +4 to 14 VDC.	A. Normal with zener diode D7 installed.



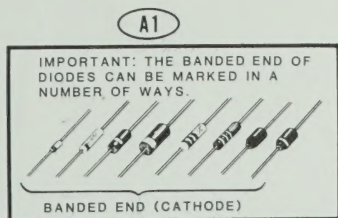
## SPECIFICATIONS

Power Requirements .....	110 to 130 VAC, 3/4-ampere 60 Hz maximum.
Output Voltage .....	Variable from approximately 4 to 18 VDC.
Output Current .....	2 amperes continuous at 4 to 18 VDC; 3 amperes with 50% duty cycle (5 minutes on, 5 minutes off) at 7 to 14 VDC.
Output Ripple .....	Less than 50 mV at full load.
Output Regulation .....	Less than 5% variation from no load to full load.
Protection .....	3/4-ampere, 3AG, slow-blow fused primary. Regulator U1 provides current limiting and thermal overload protection for the output.
Dimensions .....	7-5/8" (D) × 4-3/4" (W) × 3" (H). (19.4 × 12.1 × 7.6 cm).
Net Weight .....	3-3/4 lbs. (1.7 kg).

## SEMICONDUCTOR IDENTIFICATION

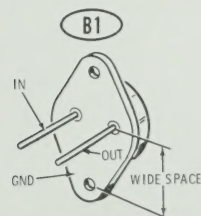
### DIODES

COMPONENT NUMBER	HEATH PART NUMBER	MAY BE REPLACED WITH	KEY NUMBER
D1-D4	57-42	1N5401	A1
D5, D6	57-27	1N5397	A1
D7	56-32	VR 13.5	A1



### INTEGRATED CIRCUIT (IC)

COMPONENT NUMBER	HEATH PART NUMBER	MAY BE REPLACED WITH	KEY NUMBER
U1	442-703	LM350K	B1



NOTES:

- 
- 54-935
- RED
- BLK/RED
- BLK/GRN
- BLK/YEL
- BLK
- RED
- D1
- D2
- D3
- D4
- (4)
- 25 VDC
- R1
- 1.2  $\Omega$
- 5W
- R2
- 1.2  $\Omega$
- 5W
- C1
- 3300
- C2
- 3300
- C3
- .1
- ORG
- U1
- 442-703
- LM350
- IN
- ADJ
- OUT
- 2-16 VDC
- D5
- 1N5397
- 57-27
- RED
- MINIMUM
- 4-18 VDC
- R5
- 120
- D6
- 1N5397
- 57-27
- C4
- 100
- RED
- BLK
- D7
- VR135
- 56-32
- (OPTIONAL)





